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First records of *Calidris canutus* Linnaeus, 1758 (Charadriiformes, Scolopacidae) and *Trogon surrucura* Vieillot, 1817 (Trogoniformes, Trogonidae) for Entre Ríos province (Argentina), and noteworthy reports of other birds in protected areas

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Abstract
We recorded 2 new bird species in Entre Ríos province, Argentina: *Calidris canutus* (Linnaeus, 1758) and *Trogon surrucura* Vieillot, 1817. In addition, we present 25 noteworthy records for bird species in El Palmar National Park, Pre Delta National Park, and other parts of the province.

Key words
Protected areas; Mesopotamic Region; range extension; new bird records; conservation.

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Introduction

In Entre Ríos province, Argentina, the advance of the agricultural frontier and increasing urbanization have left few remaining natural habitats, with varying degrees of modification (Brown et al. 2006). Protected areas (PAs) play an important role in maintaining regional biodiversity (Arzamendia and Giraudo 2004). In this context, it is important to establish PAs using scientific criteria based on gradients in species richness, ecosystem representativeness, areas of endemism, and biodiversity hotspots (Richardson and Whittaker 2010, Arzamendia and Giraudo 2012). Several works have been published on the birds of Entre Ríos (e.g. Freiberg 1943, Beltzer 1980, Salvador et al. 1985, Abadie 1988, 1993, Camperi 1992, De la Peña 1996, 1997, 2012, Beltzer et al. 2006). Additionally, lists of bird species have been published for the 2 national parks (NP) in the province: Pre Delta NP (Alonso 2008) and El Palmar NP (Marateo et al. 2009). These inventories, however, were made with limited territorial and methodological planning, as is the case for most of the Neotropical region (Bini et al. 2006). As a result, inventories of bird species in Entre Ríos and PAs within the province are still incomplete. Consequently, taxonomic and biogeographic studies continue to present changes in the composition and distribution of the avifauna of Entre Ríos (e.g. Areta et al. 2004, Bodrati

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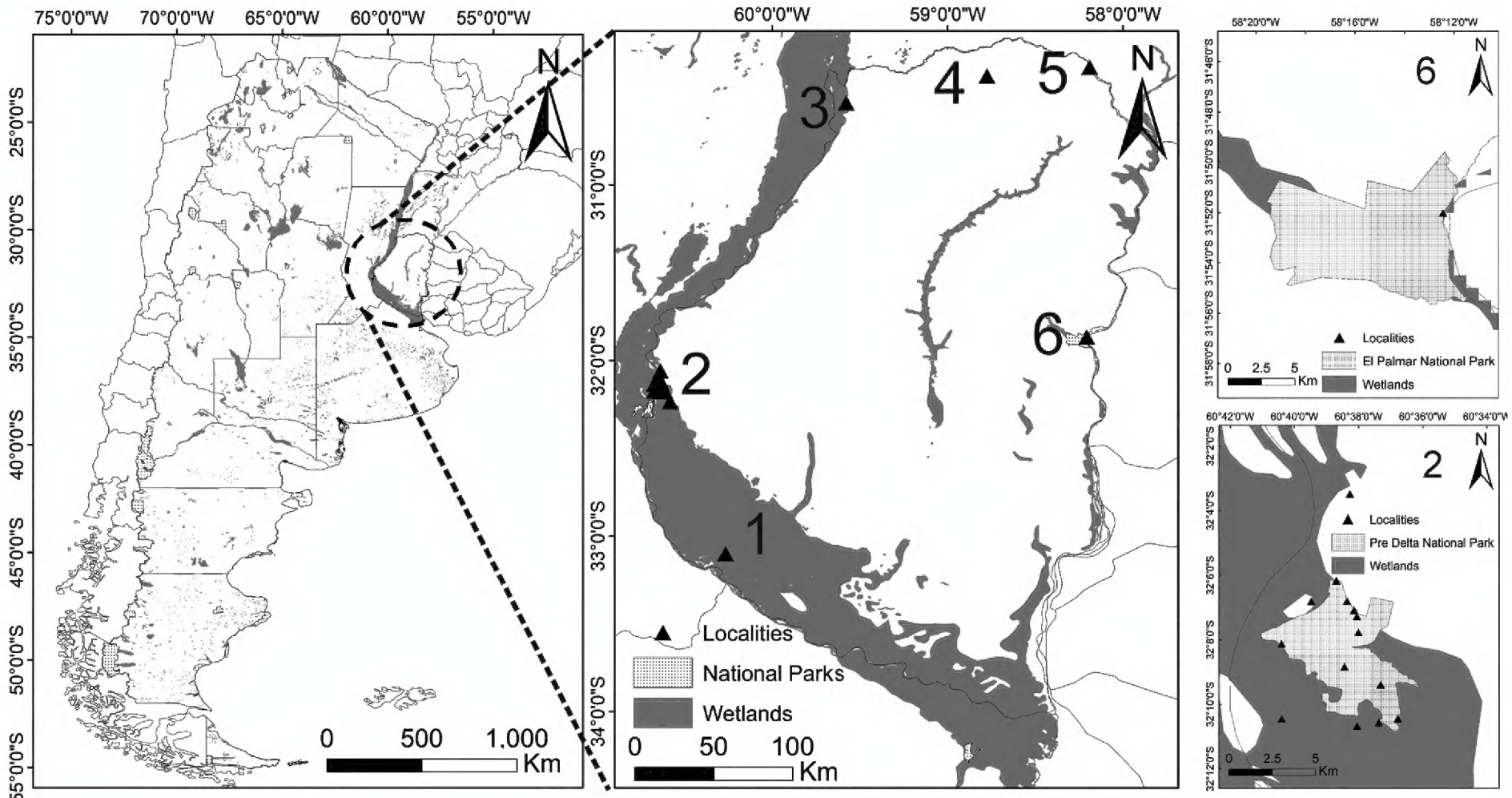

Figure 1. Study area showing localities with records of species (black triangles): (1) Records of *D. autumnalis* and *D. oryzivorus* in Irupé Island, Victoria department; (2) Records of *D. autumnalis, S. melanotos, A. bahamensis, C. major, A. nigricollis, A. cajaneus, P. maculates, F. armillata, P. dominica, C. modestus, N. semicollaris, I. plumbea, P. unicinctus, C. trochilirostris, S. maluroides, P. sclateri, T. rubrigastra, C. platensis, P. bonariensis, C. speciosum, S. ruficollis, S. palustris* and the new species for Entre Ríos *Trogon surrucura* in Pre Delta National Park, Diamante department; (3) Records of *S. griseicapillus, C. speciosum* and *S. leucoptera* in Curuzú Chalí Island, littoral of the Paraná River, La Paz department; (4) Records of *D. autumnalis* in San José de Feliciano, Guayquiraró River, Feliciano department; (5) Records of *S. maluroides* in camping of the Tunas Stream, Feliciano department; and (6) Records of a new species for Entre Ríos *Calidris canutus* in El Palmar National Park, Colón department.

and Sierra 2008, Aves Argentinas 2009, Alvarado and La Grotteria 2011, Passafaro 2012, Fernández Guaraz 2013, Cantador 2014, Reales et al. 2015). In fact, the total number of bird species present in the province is not yet known. Decisions on biodiversity conservation must be made considering the distribution of species (Brooks et al. 2006). Therefore, as part of a continuous effort and in the framework of a project that aims to assess the effectiveness of PAs for bird conservation, we present records of 2 new bird species for Entre Ríos province and noteworthy records of other birds, mainly in PAs.

Methods

The Entre Ríos province has an area of 78.781 km^2 and its extreme points are: –30.1547, –58.6539 to the north; –34.041944, –58.6367 to the south; –31.9928, –60.7225 to the east, and –30.9331, –57.8086 to the west (Fig. 1; datum WGS84). It is limited to the north by the Guayquiraró River, the Basualdo Creek, the Mocoretá River, and the Las Tunas Stream, to the south and west by the Paraná River, and to the east by the Uruguay River (Beltzer et al. 2006). Entre Ríos encompasses 3 biogeographical provinces: Paranaense (dominated by subtropical forest and riparian forest), Espinal (savannas, grasslands, temperate dry forests, and shrublands) and Pampean (mostly grasslands) (Cabrera 1976).

Data was recorded at different times and locations in the last 25 years (from 1991 to 2015) and collected in the national parks and gap areas as part of a project to define priority areas for the conservation of birds in Entre Ríos (Table 1). The goal was to produce an inventory of the avifauna of the province, focusing on threatened and poorly known birds. We reviewed the data from different lists (Freiberg 1943, Beltzer 1980, Salvador et al. 1985, Abadie 1988, 1993, Camperi 1992, De la Peña 1996, 1997, 2012, Beltzer et al. 2006, Alonso 2008, Marateo et al. 2009) to determine which species were not recorded previously in PAs. The taxonomy and nomenclature of the birds in the study follows the classification of the South American Checklist Committee (Remsen et al. 2017).

Results

New records (Fig. 1).

Calidris canutus (Linnaeus, 1758). Argentina, Entre Ríos, Colón, El Palmar National Park, on the sand banks of the littoral of the Uruguay River (–31.8670, –58.2075), recorded by Alejandro Giraudo, on 15 October 1991, photographed 1 individual (Figs 2–6).

Trogon surrucura Vieillot, 1817. Argentina, Entre Ríos, Diamante, Pre Delta National Park, in the visitation area of the park (–32.1028, –60.6447), recorded by Julian Alonso, on 19–20 October, photographed 1 adult male (Figs 7–8).

Identification. Birds were recorded visually or aurally, with the assistance of binoculars, tape recorders, and cameras (whenever possible). We identified species using field guides and taxonomic keys (Olrog 1959, 1968,

Table 1. List of 25 noteworthy bird species observed in different localities of Entre Ríos, including the nearest locality in Entre Ríos province with a record of the species.

Family/species	Locality	Date	Evidence and brief diagnosis†	Coordinates	Nearest locality
Anatidae					
* *Dendrocygna autumnalis* (Linnaeus, 1758)	A) Las Palometas Stream, PDNP. B) Irupé Lagoon, PDNP. C) Las Piedras Lagoon, PDNP. D) San José de Feliciano.	A) 10-X-2009 B) 25-X-2009; 8-XI-2009 C) 9-XII-2010 D) 10-XI-2015	A) Eight individuals observed. B) One individual observed with D. viduata; 14 individuals observed. C) One pair observed. D) Four individuals observed. Identified by: White wing band; black rump and belly.	A) −32.1739, −60.6129 B) −32.1181, −60.6579 C) −32.1740, −60.6131 D) −30.3591, −58.7728	A + B + C) Ceibas, Islas del Ibicuy, Entre Ríos, 257 km from PDNP (De la Peña 2012). D) New record for San Jose de Feliciano, Entre Ríos. Paso Telégrafo, La Paz, 90 km from San Jose de Feliciano (De la Peña 2012).
* *Sarkidiornis melanotos* (Ihering & Ihering, 1907)	Lagunas trail, Diamante.	19-IV-2011	10 individuals observed in flight. Identified by: Head and neck white, speckled with black; black upperparts and caruncle; white underparts.	−32.1181, −60.6358	Anegadizo de Paraná, Entre Ríos, 45 km from Lagunas trail (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS- Or 891).
* *Anas bahamensis* Linnaeus, 1758	A) Las Piedras Lake, PDNP. B) Irupé Lake, PDNP.	A) VIII-2009 B) 8-IX-2009	A + B) One pair observed. Identified by: White face and throat, bill with red base.	A) −32.1740, −60.6131 B) −32.1134, −60.6579	Las Cuevas, Diamante, Entre Ríos, 35 km from the new localities (De la Peña 2012).
Cuculidae					
* *Crotophaga major* Gmelin, 1788	Las Palometas Stream, PDNP.	17-II-2014	One individual observed. Identified by: Bluer than Crotophaga ani; very long violaceous tail; olivaceous-white iris.	−32.1739, −60.6129	Colón, Entre Ríos, 290 km from Las Palometas Stream, PDNP (Milat et al. 1985).
Trochilidae					
* *Anthracothorax nigricollis* (Vieillot, 1817)	Las Palometas Stream, PDNP.	23-III-2012	One female observed. Identified by: White underparts with longitudinal black band; tail less purple than the male and with small white tip.	−32.1739, −60.6129	Islas del Ibicuy, Entre Ríos, 250 km from Las Palometas Stream, PDNP (Areta et al. 2004).
Aramidae					
* *Aramides cajaneus* (Statius Muller, 1776)	Colonia de Salud Mental, Diamante.	7-IX-2007	Observed and heard. Identified by: Smaller, with breast more rufous than Aramides ypecaha; head and neck gray.	−32.0581, −60.6379	Parque Escolar Enrique Berduc, La Picada, Entre Ríos, 65 km from Colonia Salud Mental, Diamante (Mancini 2011).
Rallidae					
* *Pardirallus maculatus* (Boddaert, 1783)	A) Curutú Stream, PDNP. B) Irupé Lagoon, PDNP. C) Las Palometas Stream, PDNP.	A) 20-IV-2008 B) VI-2008 C) 20-II-2010	A) Observed nesting. B + C) Observed. Identified by: Blackish underparts, streaked and barred white; pale bill with red basal spot.	A) −32.1295, −60.6335 B) −32.1134, −60.6579 C) −32.1739, −60.6129	Paraná, Entre Ríos, 45 km from PDNP (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS-Or 4788).
* *Fulica armillata* Vieillot, 1817	Irupé Lagoon, PDNP.	23-VI-2008	One individual observed. Identified by: Yellow bill and frontal shield separated by red spot; red garter on thighs.	−32.1134, −60.6579	Paraná, Entre Ríos, 45 km from Irupé Lagoon, PDNP (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS-Or 4588).
Charadriidae					
* *Pluvialis dominica* (Müller, 1776)	El Varillal Lagoon, PDNP.	17-X-2007	One pair observed. Identified by: White eyebrow; slight wingband; pectoral streaking; rest of underparts white.	−32.1212, −60.6343	Parque Escolar Enrique Berduc, La Picada, Entre Ríos, 65 km from El Varillal Lagoon, PDNP (Mancini 2011).
* *Charadrius modestus* Lichtenstein, 1823	Totoral Lagoon, PDNP.	7-VIII-2008	Two individuals observed. Identified by: Uniform brown upperparts and breast; conspicuous white eyebrow.	−32.1777, −60.6342	Ceibas, Islas del Ibicuy, Entre Ríos, 257 km from Totoral Lagoon, PDNP (De la Peña 2012).
Rostratulidae					
* *Nycticryphes semicollaris* (Vieillot, 1816)	A, B) Las Mangas Stream, PDNP. C) El Varillal Lagoon, PDNP. D) Curutú Stream, PDNP.	A) IX-2007 B) 12-IX-2007 C) 25-VI-2008 D) During 2011	A + B + C) Observed D) Observed throughout the year; nest on the ground with 2 eggs attended by a pair on XI 2011. Identified by: white spots on wings; buffy "V" on back; long green bill with curved tip.	A, B) −32.1565, −60.6218 C) −32.1212, −60.6343 D) −32.1294, −60.6335	Paraná, Entre Ríos, 45 km from PDNP (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS-Or 2443, collected in 1926).
Accipitridae					
* *Ictinia plumbea* (Gmelin, 1788)	Azotea Stream, PDNP.	4-II-2010	Flock observed in flight. Identified by: Gray; pale head; rufous primaries; tail black with two white bands.	−32.1028, −60.6449	El Palmar National Park, Entre Ríos, 267 km from Azotea Stream, PDNP (Marateo et al. 2009).

Table 1. *Continued.*

Family/species	Locality	Date	Evidence and brief diagnosis†	Coordinates	Nearest locality
* *Parabuteo unicinctus* (Temminck, 1824)	A) Seibos Stream, PDNP. B) Paraje La Jaula, PDNP.	A) 2-VII-2008 and 25-IX-2008 C) 27-IX-2008; 16-VIII-2009	A + B) Observed Identified by: Rufous underwing coverts with a white stripe; rufous thighs; long tail black with a white tip and base.	A) −32.1565, −60.6218 B) −32.1181, −60.6358	Las Cuevas, Diamante, Entre Ríos, 35 km from the new localities (De la Peña 2012).
Furnariidae					
Sittasomus griseicapillus (Temminck, 1821)	Curuzú Chalí Island, littoral of the Paraná River, La Paz.	I-II-1997	Seen and heard. Identified by: Anterior half of body olivaceous, posterior half rufous.	−30.5307, −59.5788	‡ The southernmost record in Argentina. Malabrigo Stream, Santa Fe, 150 km from Curuzú Chalí Island (De la Peña 2011).
* *Campylorhamphus trochilirostris* Lichtenstein, 1823	A) Paraje La Jaula, PDNP. B) Sacacalzones Stream, PDNP. C) Tortugas Stream, PDNP.	A) XI- and XII-2008, 18-X-2009 B) X- and XI-2008 C) 6-IV-2009	A) Observed and photographed. B) Observed and heard. C) Observed. Identified by: Extremely long and thin, very curved reddish bill; rufous body.	A) −32.11811, −60.63578 B) −32.24334, −60.64419 C) −32.17594, −60.62282	Parque Escuela Rural Enrique Berduc, La Picada, Entre Ríos, 65 km from PDNP (Mancini 2011).
* *Spartonoica maluroides* (D'Orbigny & Lafresnaye, 1837)	A) El Varillal Lagoon, PDNP. B) Sacacalzones Stream, PDNP. C) Tunas Stream, Feliciano.	A) 9, 17-IV-2008 B) 13-IV-2012 C) 14-XI-2015	A + B) Observed. C) Observed and heard. Identified by: Ample rufous forehead; upperparts streaked black.	A) −32.1212, −60.63429 B) −32.2433, −60.64419 C) −30.3306, −58.1935	A + B) Victoria Island, Entre Ríos, 70 km from PDNP (Di Giacomo et al. 2007). C) Santa Elena, Entre Ríos, 180 km from PDNP (specimen in Museo Argentino de Ciencias Naturales N° 43496).
Tyrannidae					
* *Pseudocolopteryx sclateri* (Oustalet, 1892)	A) Seibo Stream, PDNP. B) El Varillal Lagoon, PDNP. C) Curutú Stream, PDNP.	A) 24-I-2008 B) 9-IV-2008 C) IV-2008	A) One pair observed. B + C) Observed. Identified by: Erectile black crest streaked yellow; whitish eyebrow; conspicuous yellow edging to blackish coverts.	A) −32.1565, −60.6218 B) −32.1212, −60.6343 C) −32.1295, −60.6335	First record in Entre Ríos was in El Palmar National Park, 267 km from PDNP (Marateo et al. 2009).
* *Tachuris rubrigastra* (Vieillot, 1817)	A) Curutú Stream, PDNP. B) Curiyú Lagoon, PDNP. C) El Varillal Lagoon, PDNP.	A) 17-VI-2008 B) 28-II-2011 C) 19-V-2012	A + B + C) Observed. Identified by: Black crown with red center; white wingband; white outer rectrices; black half-collar and tail; rosy undertail coverts.	A) −32.1295, −60.6335 B) −32.1285, −60.6340 C) −32.1212, −60.6343	Paraná, Entre Ríos, 45 km from PDNP (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS-Or 4311).
Troglodytidae					
* *Cistothorus platensis* (Latham, 1790)	El Varillal Lagoon, PDNP.	30-IX-2009	One individual observed. Identified by: Black and whitish dorsal streaking; orange legs; cinnamon rump.	−32.1212, −60.6343	El Palmar National Park, Entre Ríos, 267 km from El Varillal, PDNP (Marateo et al. 2009).
Thraupidae					
* *Pipraeidea bonariensis* (Gmelin, 1789)	A) Entrance of the PDNP. B) Paraje La Jaula, Diamante.	A) 1-IV-2009; I-II-III-2010-2011 B) 19-VI-2009	A + B) Observed. Identified by: Violaceous sky-blue hood; orange rump and breast.	A) −32.1133, −60.6394 B) −32.1181, −60.6358	Las Cuevas, Diamante, Entre Ríos, 35 km from PDNP (specimen in Museo de Ciencias Naturales y Antropológicas "Profesor Antonio Serrano", N°MAS-Or 1038).
Conirostrum speciosum (Temminck, 1824)	A) Island Curuzú Chalí, littoral of the Paraná River, La Paz. B) Margin of the Tortugas Stream, PDNP.	A) I-II-1997 B) III-2008	A) Seen and heard. B) Lone male atop Tessaria integrifolia. Identified by: Gray sky-blue back and rufous undertail coverts.	A) −30.5307, −59.5788 B) −32.1759, −60.6228	B) The southernmost record in Entre Ríos province. Salto Grande Reservoir, Entre Ríos, 276 km from the Tortugas Stream, PDNP (Bonomi et al. 2017).
Sporophila leucoptera (Vieillot, 1817)	Curuzú Chalí Island, littoral of the Paraná River, la Paz, Entre Ríos.	I-II-1997	Seen and heard. Identified by: White underparts; conspicuous white wingband; dark orange bill.	−30.5307, −59.5788	‡ The southernmost record. Romang, Santa Fe, 110 km from Curuzú Chalí Island (De la Peña 1996).
* *Sporophila ruficollis* Cabanis, 1851	A) Seibo Stream, PDNP. B) Paraje La Jaula.	A) 24-I-2008 B) V-2008	A + B) Observed. Identified by: Ample black bib; rest of underparts and rump rufous.	A) −32.1565, −60.6218 B) −32.1181, −60.6358	Las Cuevas, Diamante, Entre Ríos, 35 km from the new localities (De la Peña 2012).
* *Sporophila palustris* Barrows, 1883	A) Entrance of the PDNP. B) Paraje La Jaula. C) Azotea Stream, PDNP.	A) IV-2012 B) V-2012 C) 10-IX-2006	A + B + C) Observed. Identified by: Plumbeous back; ample white bib; rufous rump and underparts.	A) −32.1133, −60.6394 B) −32.1181, −60.6358 C) −32.1028, −60.6449	Las Cuevas, Diamante, Entre Ríos, 35 km from the new localities (De la Peña 2012).
Icteridae					
Dolichonyx oryzivorus (Linnaeus, 1758)	Irupé Island, Victoria, Entre Ríos.	I-2013	171 individuals observed. Identified by: Streaked upperparts and flanks; line on black crown, long eyebrow and underparts buffy.	−33.1562, −60.2991	Estancia la Catalina, Entre Ríos, 60 km from Irupé Island (Marino et al. 2013).

* First record for Pre Delta National Park (PDNP).
† Identification guides and taxonomic keys used for diagnosis: Olrog (1959, 1968, 1979); Canaveri et al. (2001); Rodríguez-Mata et al. (2006); Narosky and Yzurieta (2010).
‡ Species that do not present other records in Entre Ríos province.

Figures 2–6. Photographs of *Calidris canutus* (Linnaeus, 1758) taken on the beaches of El Palmar National Park, Colón, Entre Ríos, Argentina.

1979, Canaveri et al. 2001, Rodríguez-Mata et al. 2006, Narosky and Yzurieta 2010). We used external morphological characters such as the color of different body parts to compare and determine species.

Scolopacidae

Calidris canutus (Linnaeus, 1758)

This species can be distinguished from other *Calidris* (especially *C. alba*) by the following characteristics: larger size (23–25 cm) than *C. alba* (17 cm), making it the largest *Calidris* to inhabit Argentina; fairly thick, black bill; barred flanks and rump (Figs 2–6); and greenish legs (this characteristic cannot be observed in Figs 2–6). Moreover, *C. canutus* is gray in color, with an ash-gray back (Figs 2–6), and is more robust than *C. alba* (Canaveri et al. 2001, Rodríguez-Mata et al. 2006, Narosky and Yzurieta 2010).

Trogonidae

Trogon surrucura Vieillot, 1817

The male of this species can be distinguished by its metallic blue hood and breast, black cheeks and throat, and dark green back, while the rest of the underparts are red and the undertail is white (Figs 7-8) (Narosky and Yzurieta 2010). This latter character was observed, but it is not distinguishable in the photographs. The most similar species in Argentina is *T. currucui* (Linnaeus, 1766), but it is found only in the Yungas region (northern Argentina, in the provinces of Tucumán, Salta, and Jujuy) and in eastern in Formosa province (Olrog 1979, Narosky and Yzurieta 2010). In addition, *T. currucui* presents black and white barring in the outer rectrices and the undertail (Olrog 1968, 1979).

Discussion

Calidris canutus and *Trogon surrucura* are both new to the avifauna of Entre Ríos (Freiberg 1943, De la Peña 1996, 2012, Beltzer 2006).

Figures 7–8. Photographs of *Trogon surrucura* Vieillot, 1817 taken in the visitation area of the Pre Delta National Park, Diamante, Entre Ríos, Argentina.

The new record of *Trogon surrucura* significantly increases the distribution range of this species. This species inhabits the central and southern parts of Brazil (states of Rio de Janeiro, Minas Gerais, Goiás, São Paulo, Mato Grosso do Sul, Paraná, Santa Catarina, and Rio Grande do Sul), and eastern Paraguay, while in Argentina it is present in Misiones, northern Corrientes, eastern Formosa and Chaco, and northern Santa Fe. This observation represents the southernmost record of this species, 390 km south of its previously known distribution in Argentina (Ramsar Site Jaaukanigás, Reconquista, Santa Fe) (Giraudo et al. 2008) and 650 km southwest from Cerro Largo, Uruguay (Claramunt and Cuello 2013).

Calidris canutus breeds in the Arctic region of North America and Asia and spends the non-breeding period in more southern latitudes of the Northern Hemisphere and in the Southern Hemisphere. *Calidris canutus* is found almost exclusively in marine coasts, although there are records in inland water environments (Piersma et al. 1996). For example, *C. canutus* was recorded in the continental Lagoons of Melincué and El Cristal, in the neighboring province of Santa Fe (Rozzatti and Mosso 1997, Blanco et al. 2001, Romano et al. 2005). This subspecies is found in southern South America (*C. canutus rufa*) migrates long distances, from the arctic tundra to Tierra del Fuego, making a few stops on its journey south (Piersma et al. 1996). It can be found on the marine coasts of southern South America during the non-breeding period (especially in Las Lomas Bay and San Sebastián, in Tierra del Fuego). In the southern autumn, it can also be found on the Uruguayan, Argentinean, and southern Brazilian coasts during its migration to the north (Piersma et al. 1996).

Additionally, we also obtained new records for 25 poorly known species in the Pre Delta NP and El Palmar NP and other locations in the province (Table 1) (Freiberg 1943, De la Peña 1996, 2012, Beltzer et al. 2006, Alonso 2008, Marateo et al. 2009). Seven of these species are categorized as Vulnerable (*Charadrius modestus, Spartonoica maluroides,* and *Sporophila ruficollis*), Endangered (*Calidris canutus and Sporophila palustris*) and Threatened (*Sarkidiornis melanotos* and *Dolichonyx oryzivorus*) according to the national list of threatened birds of Argentina (López-Lanús et al. 2008). For Entre

Ríos, Freiberg (1943) indicates a total of 301 species and De la Peña (1997) a total of 333, although the latter indicates a total of 261 species 16 years later, considering only his empirical data (De la Peña 2012). On the other hand, Beltzer et al. (2006) present a total of 291 species in the province. We remark that the total number of bird species in Entre Ríos is still uncertain. According to the data from 25 years of our own field sampling, literature research with reliable data and the review of 7 museum collections, the total number of bird species that inhabit Entre Ríos province probably surpasses 350 species, including the new data herein. The new records presented in this study are a contribution to the knowledge of the distribution of birds in Entre Ríos. We confirmed the presence of 22 bird species in the national parks, which were not recorded before in any protected area in the province.

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Authors' Contributions

JA, JAS, AG, and AB collected the data; JA, JAS, and AG, wrote the text; and JAS and AG made the descriptive analysis.

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